

CLAIMS:

1. A method for reducing sludge viscosity of a sewage sludge having a solids concentration of at least 10% (w/w), comprising the steps of:
 - 5 (a) increasing the pH of the sludge to the range of 9.5-12.5;
 - (b) selecting at least one step from (i) maintaining the sludge at the pH of (a) and at a temperature of 10-37°C for a period of at least one day, and (ii) adding one or more inorganic or organic chemicals to the sludge, such chemicals contributing to viscosity reduction;
 - 10 (c) incubating the sludge by maintaining the resultant sludge at a temperature in the range of 40-100°C for a period of time of at least one hour;
 - (d) subjecting the sludge to physical shearing or disintegration; and
 - (e) subsequently discharging the sludge.
- 15 2. The method of Claim 1 in which step (b)(i) is selected.
3. The method of Claim 1 in which step (b)(ii) is selected.
4. The method of Claim 1 in which both step (b)(i) and step (b)(ii) are
20 selected.
5. The method of Claim 1 in which at least one of a sodium or potassium salt is added in step (b) (ii).
- 25 6. The method of Claim 1 in which steps (c) and (d) are carried out simultaneously.
7. The method of Claim 1 in which steps (c) and (d) are carried out sequentially.
- 30 8. The method of Claim 5 in which the salt is at least one of sodium or

potassium chloride.

9. The method of Claim 1 in which an oxidizing agent is added in step (b) (ii).

5

10. The method of Claim 9 in which the oxidizing agent is selected from the group consisting of oxygen, chlorine, perchlorate, perchlorite, hydrogen peroxide, nitric acid, sulphuric acid, potassium permanganate, sodium perborate and ozone.

10

11. The method of Claim 1 in which the solids concentration of >10% is obtained using a screw press, belt press or a centrifuge.

15

12. The method of Claim 1 in which the sludge pH is adjusted to 10.5 – 11.5.

13. The method of Claim 1 in which the pH of the sludge is adjusted to at least 12 for 2h and then to at least 11.5 for 22 h.

20

14. The method of Claim 1 in which the sludge is held in step (c) at a temperature and for a time sufficient to eliminate microbial pathogens.

15. The method of Claim 1 in which the pH is increased using a mono or divalent hydroxide.

25

16. The method of Claim 15 in which the pH is increased using lime.

17. The method of Claim 1 in which some or all of the shearing of step (d) is effected by the action of pumps.

30

18. The method of Claim 1 in which at least one of the treatments occurs

in a batch procedure.

19. The method of Claim 1 in which at least one of the treatments occurs in a continuous procedure.

5

20. A low viscosity sewage sludge prepared according to the method of Claim 1.

10 21. The low viscosity sewage sludge of Claim 20 that has been further processed by physical, chemical and/or biological methods.

22. A low viscosity sludge concentrate produced by the method of Claim 20 which has a viscosity suitable for application of the sludge to land by spraying, injection or other methods.

15

23. A low viscosity sewage sludge prepared by the method of Claim 20 that is suitable for disposal.

20 24. Apparatus for reducing the sludge viscosity of a sewage sludge, comprising:

- 25 (a) a device for concentrating and/or dewatering the sludge;
- (b) a device in which the viscosity of the sludge obtained from the device of (a) is reduced;
- (c) a device to subject the sludge obtained from the device of (b) to shearing; and
- (d) means to control the flow and temperature of sludge, said means including means to subject the sludge to holding steps.

30 25. The apparatus of Claim 24 in which the device of (a) is a screw press or belt press.

